1. Psychology : A Scientific Discipline

Learning objectives :

1. To understand the key features of science and explain.
2. To acquire knowledge on the history of psychology as a science.
3. To know about the various research methods, their key features and apply the same knowledge in future.
4. To understand and explain the major challenges in establishing psychology as a science.
5. To understand the term Rationality and characteristics of a rational person and explain its application in day to day life.

Activity 1

Read the following statements

Think and discuss whether the given statements are facts or myths and misconceptions about psychology :

1. Psychology is just common sense and not a real science.
2. Psychology is simply a pseudoscience.
3. Psychologists are simply mind readers or the face readers.
4. Psychology is related only to the study of crazy people who are in need of therapy.
5. Psychologists, psychiatrists and counsellors have the same professional qualifications and their jobs are almost of the same nature.
6. Anyone with a degree in psychology can provide counselling to a needy person.

1.1 Introduction :

We live in an age of science. Almost every sphere of our life is influenced by sciences. Since the evolution of Homo sapiens as a species, the survival instinct of humankind has led humans to explore the world around them, which gradually led to the development of various sciences.

Today, sciences are broadly classified into three basic groups viz. the physical sciences (physics, chemistry, geology, etc.), the biological sciences (zoology, botany, physiology, etc.) and the social sciences (psychology, sociology, economics, etc.)

Some people question whether, Psychology really is a science or not? To answer this question, you first need to know the answers to two questions viz. What is science? and What is psychology?

This chapter aims at answering these two complex questions by providing insights into the topics like key features of science, history of psychology as a science, the research methods in psychology, challenges in establishing psychology as a science and the importance of rationality.

1.2 Key features of science :

The word science is derived from the Latin word 'Scientia' which means knowledge. Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidences. The following are some of the key features of science:

1. **Empirical evidence :** Science is an evidence-based approach to study and interpret information. Empirical evidence refers to acquiring information through direct observation or experiments. Scientific knowledge is based on verifiable evidence so that other investigators can observe or measure the same phenomena and verify its accuracy in future.
2. **Objectivity :** Science objectively studies the phenomenon under consideration. Objectivity means the ability to see and accept the facts as they are and not as the investigator might wish them to be. Objectivity means that all sources of biases, prejudices, beliefs, wishes, values, preferences, etc. are set aside while investigating a particular phenomenon.
3. **Scientific causality :** Science aims at finding out the cause-effect relationship between variables under consideration. In a scientific study, a researcher tries to control all extraneous variables in order to find out the effect of the independent variable (cause) on the dependent variable (effect).
4. **Systematic exploration :** Science adopts a certain sequential procedure for studying a particular phenomenon. Sequential procedure includes few scientific steps like identifying the problem, formulation of hypothesis, collection of facts, analysis of facts, scientific generalization and prediction.
5. **Replication :** Replication means reproducibility of scientific knowledge under the same circumstances stated anywhere and anytime. Replication assures the reliability of results and it enables in establishing a scientific theory.
6. **Predictability :** Predictability is an important feature of science. Scientists do not merely describe the phenomena being studied, but also attempt to explain it and make predictions accordingly.

Activity 2

Read the following statements and discuss about the same in the classroom :

1. Psychology is a science because it fulfills many conditions of science.
2. Psychology is not an exact science like physics or chemistry.
3. Psychology is a social science that studies human (and animal) behavior and mental processes.
4. Psychology uses some objective research methods, it examines cause-and-effect relationships to produce laws governing human behavior and its findings can be verified.
5. Psychology can be distinguished from pseudoscience and folk wisdom as psychology has evidence against its theories.
6. The subject matter of psychology is complex as human behavior is dynamic and the mental processes are abstract. Therefore, the theories of psychology are not as universal, exact and precise as those in physics and chemistry.

1.3 History of psychology as a science :

1. **Psychology begins as a branch of Philosophy :** The origin of psychology dates back to the Ancient Greeks. Psychology did not emerge directly as a science. Psychology was a branch of philosophy until the 1870s.
2. **Psychology emerges as a separate discipline in 1879 :** Wilhelm Wundt, a German psychologist established the world's first psychology laboratory in 1879 in Germany at University of Leipzig. This event is considered as the official start of psychology as a separate scientific discipline.
3. **Emergence of structuralism :** Structuralism is widely regarded as the first school of thought in psychology. Wilhelm Wundt and his student Edward B. Titchener advocated Structuralism. Wilhelm Wundt used the method of introspection to study the conscious experiences like sensation, perception, etc.
4. **Emergence of Functionalism :** Functionalism was advocated by William James. He is known as the father of 'American Psychology'. He emphasized on the study of human consciousness.
5. **Emergence of Psychoanalysis :** In contrast to the early schools of thoughts, an Austrian physician named Sigmund Freud proposed a theory of Psychoanalysis in early 1890s. He gave importance to the study of the unconscious mind.
6. **Emergence of Behaviourism :** During the early 20th century, an American psychologist named John B. Watson advocated a new school of thought known as Behaviorism. Behaviourism rejected both the study of conscious experiences and unconscious mind and made psychology a more scientific discipline by focusing on the study of observable behaviours.
7. **Emergence of Humanistic Psychology :** The first half of the 20th century was dominated by Psychoanalysis and Behaviourism. During the second half of the 20th century, Carl Rogers, an American psychologist advocated the new perspective known as Humanistic Psychology. In contrast to the study of unconsciousness

advocated by psychoanalysis and determinism advocated by behaviourism, humanistic psychology stressed upon the study of power of free will, self – determination and self actualization.

8. **Emergence of Cognitivism:** During the 1950s and 1960s, Psychoanalysis and Behaviourism were replaced by the new perspective known as Cognitivism. American psychologist named Ulric Neisser is generally considered as the founder of Cognitivism. Researchers in Cognitive Psychology study higher cognitive processes like memory, decision-making, problem-solving, intelligence, language, etc. with the tools like MRI and PET scans.

Activity 3

Visit the website given below and collect information about various schools of thought of psychology : https://www.verywellmind.com/psychology-schools-of-thought-2795247

1.4 : Research methods in psychology :

1.4.1 Experimental method :

Experimental method is one of the most scientific method of studying behavior. It is the method which has assigned the status of science to psychology. In experimental method, the experimenter conducts experiments using following steps :

1. Identifying problem
2. Developing hypothesis
3. Selecting an experimental design and standardizing the experimental procedure
4. Conducting experiment and collecting data.
5. Analyzing data
6. Drawing conclusions.

Activity 4

Learn the Key Terms of experimental method with the help of given example :

1. Problem: To study the effect of music on the level of blood Pressure.
2. Hypothesis: The music will help in regulating the level of blood pressure.
3. Independent variable: Music.
4. Dependent variable: Level of blood pressure.
5. Intervening variables: Age, gender, all other sounds other than music, etc.
6. Experimenter : A person who will be conducting this experiment. (May be you or your psychology teacher.)
7. Participant : A person on whom this experiment will be conducted. (May be your family member/ friend.)

Some of the important features of experimental method can be explained as follows :

1. Experimental method is one of the most objective method of collecting data.
2. It enables accurate observations in controlled conditions.
3. Experimental method helps in finding out the cause and effect relationship between two or more variables.
4. The findings of the experimental method are verifiable.

Do you know ?

Certain aspects of human behaviours cannot be studied by the experimental method due to ethical constraints and some risk factors involved.

Activity 5

Find out the Independent Variable and Dependent Variable from the experiment ideas given below :

(1) To study the effect of practice on memory.

(2) To study the effect of mental set on problem solving.

(3) To study the effect of noise pollution on the speed of writing.

(4) To study the effect of colour on perception.

(5) To study the effect of feedback on decision making.

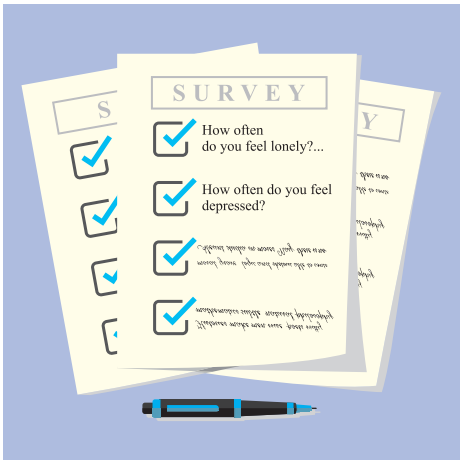
Activity 6

Conduct the following experiment and find out whether the color of text has any impact on memory:

1. Randomly assign participants to two groups. (See to it that age, gender, cultural background, etc. of all participants is same.)
2. Ask one group to read a list of 20 words written in black ink for 5 minutes.
3. Ask the second group to read a list of the same 20 words for the same amount of time, but instead written in green ink.
4. After 5 minutes, ask participants from both the group to write down as many words as they can recall on a plain paper.
5. Compare the recall scores and conclude.

1.4. 2 Survey method :

A survey is defined as a research method used for collecting data from a pre-defined group of respondents (sample) to gain information and insights on various topics of interest such as political opinion, consumers' preferences, etc. Survey method makes use of questionnaires, checklists, rating scales, inventories, interviews etc. to collect the required information. The Survey method is largely used by social psychologists, educational psychologists, industrial psychologists etc. Survey method is an economic and an efficient method of data collection. Surveys can be undertaken using email, telephonic calls or direct interaction with respondents.



Specimen of a questionnaire used in survey method

Activity 7

Discuss about the following topics which can be studied using survey method :

1. Determinants of job satisfaction
2. The problems of working women
3. Exercise and physical health
4. Causes of students absenteeism
5. Causes of alcoholism
6. Addiction to virtual online games.
7. Social networking and cyber-crimes
8. Problems faced by senior citizens

1.4.3 Observation method:

Observation method is a research method which is very useful in the areas where experiments cannot be conducted. It is a method in which behaviour is observed in a natural or laboratory setting. Observation carried out in a natural setting is called natural observation and observation carried out in a laboratory setting is called controlled observation.

Observation method is widely used by child psychologists, clinical psychologist, social psychologists, etc. Observation method can be treated as a scientific method and will be beneficial when it is used with the specific purpose of the research and planned in a systematic way.

Activity 8

Discuss about the following topics which can be studied using observation method:

(1) Aggressive tendencies shown by teenagers.

(2) Reactions of passengers stuck in heavy traffic.

(3) Body language of students participating in the elocution competition.

(4) Civic sense shown at public places.

(5) Student's behaviour at the book exhibition.

1.4.4 Case study method :

Case study is one of the qualitative research methods used in psychology. This method is mostly used by clinical psychologists. Sigmund Freud and Jean Piaget were the two important figures to use case study method widely. Case study is an in-depth look at an individual, group or a particular event. Case study can be treated as a scientific method as it provides rich descriptive information often suggesting hypotheses for further studies.

In case study method, a researcher collects information about a particular individual (case) from multiple sources such as parents, family members, peers, teachers, colleagues, etc. to assess the individual's current level of psychological functioning. A researcher while using case study method may use several techniques like observation, interview, psychological tests, etc. to collect information about a particular individual.

Activity 9

Read the following well known classical case

The Case of "Anna O."

"Anna O" (Real name : Bertha Pappenheim) was suffering from a variety of odd physical and psychological symptoms. One of them was that for several weeks she was unable to drink any fluids.

"Anna O" would pick up the glass of water, but as soon as it touched her lips she would push it away like someone suffering from hydrophobia. "Anna O" lived only on fruit, such as melons, etc., so as to lessen her tormenting thirst.

During hypnosis, "Anna O" grumbled about her English "lady-companion," whom she did not care for, and went on to describe, with every sign of disgust, how she had once gone into this lady's room and how her little dog had drunk out of a glass

there. During hypnosis "Anna O" asked for something to drink, drank a large quantity of water without any difficulty and awoke from her hypnosis with the glass at her lips; and thereupon the disturbance (inability to drink water) vanished, never to return.

Freud's interpretation was that "Anna O" had repressed the memory of incident (dog had drunk out of a glass) along with the emotion that it triggered and that this was what had caused her inability to drink. Furthermore, during hypnosis, "Anna O's" recollection of the incident, along with her expression of the emotion she had repressed, caused the symptom to go away.

Sigmund Freud

The case of "Anna O" played a remarkable role in the establishment and development of psychoanalysis by Sigmund Freud.

Activity 10

Discuss about the following topics which can be studied using case history method:

1. A patient suffering from phobia
2. A student suffering from dyslexia
3. A farmer who attempted suicide
4. A successful young entrepreneur
5. Gold medallist athlete

1.4.5 Correlation studies :

There are certain scientific studies which make use of correlation as a statistical tool to understand the relation among variables. Such studies are called correlational studies.

Correlation is a statistical tool used to measure the relationship between two or more variables. If the change in one variable appears to be accompanied by a change in the other variable, the two variables are said to be correlated and this interdependence is called correlation.

The extent of correlation between two variables is measured by correlation coefficient. A correlation coefficient is always a number between –1.00 to +1.00 The sign (+ or –) of a correlation coefficient indicates the direction of the relationship between the variables.

There are three types of correlation :

1. **A positive correlation :** When both variables either increase or decrease at the same time, they are said to have a positive correlation between them. In case of positive correlation, the value of correlation is found between 0.00 and +1.00 For example, The amount of rehearsal and recall score.
2. **A negative correlation :** When an increase in one variable is associated with a decrease in the other and vice versa, they are said to have a negative correlation between them. In case of a negative correlation, the value of correlation is found between 0.00 to -1.00 For example, amount of exercise and level of body fats.
3. **A zero correlation :** When any change in one variable brings no significant change in other variable, they are said to have a zero correlation. In case of zero correlation, the value of correlation coefficient is found to be 0. For example, height and intelligence.

Activity 11

Remember the information given in the following table :

Type of correlation	Variable 'X'	Variable 'Y'
Positive correlation	Rises ↑	Rises ↑
	Falls ↓	Falls ↓
Negative correlation	Rises ↑	Falls ↓
	Falls ↓	Rises ↑
Zero correlation	Rises ↑	No significant change
	Falls ↓	

Activity 12

Discuss about the following topics that can be studied using correlation study method :

(1) Bunking lectures and score in exams

(2) Weight and intelligence

(3) Amount of salary and level of job satisfaction

(4) Rehearsal and forgetting

(5) Height and aptitude in music

(6) Urbanization and pollution

(7) Speed of vehicles and road accidents

1.5 Challenges in establishing psychology as a science :

Although psychology is considered to be a scientific discipline, it has many controversies. Controversies and criticisms of psychology have been made on theoretical, practical, ethical and philosophical grounds. The following controversies and criticisms are the challenges in establishing psychology as a science :

1. **Psychology in pre-paradigmatic state :** In contrast to mature and natural sciences such as physics and chemistry, psychology is younger and a social science. Though psychology is considered as a science, according to philosopher named Thomas Kuhn, psychology is still in a pre-paradigmatic state.

   Psychology has not succeeded yet in producing a cumulative body of knowledge that has a clear conceptual core that is consequently agreed upon by experts in psychology.

2. **Issues related to objectivity and validity:**

   Some areas of psychology such as personality, leadership, creativity, emotions, attitudes, etc. rely on "soft" research methods such as surveys and questionnaires, etc. Methods such as introspection and psychoanalysis are inherently subjective. Therefore, psychology to some extent falls short on the criteria of objectivity and validity.

3. **Issues related to predictability and replicability :** A major goal of psychology is to predict behaviour by understanding its causes. In psychology, making exact predictions is difficult as people respond differently in different situations. Human behaviour is more difficult to study than particles and chemical compounds. Therefore, the test results in psychology are more varied, harder to control and difficult to replicate.

4. **Objectifying humans :** Some existential and humanistic psychologists from within the field criticizes that, by subjecting the human behaviour to experimentation, psychologists objectify persons. Since it treats human beings as things, as objects that can be examined by experiments, psychology is sometimes portrayed as dehumanizing what is most essential about being human.

1.6 Importance of rationality :

Being a science, psychology tries to establish laws that govern human behavior, at the same time it accepts the fact that human behavior is dynamic and complex. Some of our behaviors are commonly seen in others at the same time some of our behaviors are exclusive.

Attaining happiness is man's greatest aim in life. While achieving this aim, every individual feels, thinks and acts exclusively. But while being happy one should see to it that one's emotions, thoughts and acts do not get driven by irrational influences and one should not compromise on social norms, values and ethics for being happy. Here the aspect of rationality comes in picture in psychology.

Sciences are appreciated by society when application of scientific knowledge improves the quality of life. Like other sciences, psychology too helps in improving the quality of life by applying the concept of rationality in day to day life.

Stanovich and his colleagues while talking about rationality stated that, "Rationality involves adaptive reasoning, good judgement and good decision making."

Sternberg and his colleagues while talking about intelligence suggested that Practical Intelligence can be defined as "the ability to perform successfully in naturalistic settings in a way that is consistent with one's goal."

Dr. Albert Ellis who proposed Rational Emotive Behavioral Therapy (one of the effective and popular method of intervention in the field of counselling psychology) has given values of rational living. He also says that rational people are psychologically healthy people and they possess certain characteristics. Some of them are given ahead :

1. **Understanding self-interest and social interest :** 'Safeguard your self-interest and know others interest' is almost like a slogan of Rational Emotive Behavioural Therapy. Rational people understand what is self-promoting and what helps them to grow and they take responsibility of making those choices but at the same time take care of not violating other person's rights and aid in survival of the society in which they live.
2. **Self-direction :** Rational people assume primary responsibility for their own lives rather than demanding or needing excessive support or nurturance from others.
3. **Tolerance :** Rational people are highly tolerant. Tolerance is the willingness to accept behavior and beliefs of others that are different from one's own. Similarly, rational people accept one's own and others' right to be wrong.
4. **Flexibility :** Rational people are found to be healthy individuals. Rational people tend to be flexible, unbiased in their thoughts and actions.
5. **Self-acceptance and self-responsibility :** Rational people accept themselves unconditionally rather than rating or proving themselves and also accept responsibility for their own thoughts, beliefs, feelings and behavior.

According to Dr. Albert Ellis, rationality as a personal philosophy helps an individual to attain many goals in life and to be happy. For being happy a person must BE RATIONAL. This concept is explained with the help of the following table :

B (Balance)	Balance between self-interest and interest of others
E (Estimate)	Estimate the time, efforts, gains and losses
R (Respect)	Respect oneself and others
A (Affiliate)	Affiliate with others
T (Tolerate)	Tolerate oneself and others
I (Intergrate)	Integrate personal wellbeing with social wellbeing
O (Optimize)	Optimize potential fully
N (Navigate)	Navigate path of success
A (Accept)	Accept the limitations and overcome them
L (Live)	Live life fully

Summary

- Empirical evidence, objectivity, scientific causality, systematic exploration, replication and predictability are some of the key features of science.
- Psychology is considered as a science as it fulfils many conditions of science. Psychology is a social science that studies behaviour and mental processes.
- Wilhelm Wundt, opened the world's first psychology laboratory in 1879 in Germany at University of Leipzig. This event is considered as the official start of psychology as a separate scientific discipline.
- Experimental method, survey method, observation method, case study method, correlation studies, etc. are some of the research methods of psychology.
- Pre-paradigmatic stage of psychology, issues related to objectivity, validity, predictability, replicability and ethical controversies are the challenges in establishing psychology as a science.
- Psychology helps in improving the quality of life by applying rationality in day to day life.

Important Concepts

- Replicability
- Independent Variable
- Dependent Variable
- Participant
- Interview
- Correlation coefficient

Important Psychologists

- **Edward B. Titchener :** Edward Titchener was a student of Wilhelm Wundt. He belongs to Structuralism school of thought of psychology.

- **William James :** William James was the first educator to offer a psychology course in the United States, earning him the title 'Father of American Psychology.' He is considered as the founder of Functionalism school of thought of psychology.

Exercises

Q.1. Choose the correct option and Complete the following statements :

(1) Till 1879, psychology was a branch of …...
a. physics b. philosophy
c. physiology

(2) Psychology is a ……. science.
a. natural b. social c. biological

(3) ……..is considered as founder of Psychoanalysis.
a. Wilhelm Wundt b. Carl Rogers
c. Sigmund Freud

Q.2. Match the Pairs :

Group 'A'	Group 'B'
1. Structuralism	a. John Watson
2. Functionalism	b. Carl Rogers
3. Behaviourism	c. Ulric Neisser
4. Cognitivism	d. William James
	e. Wilhelm Wundt

Q.3. State whether the following statements are true or false :

(1) Psychology is a study of mental processes.
(2) Case study method is quite often used by clinical psychologists.
(3) An experimenter is a person on whom the experiment is conducted.

Q.4. Answer the following in one sentence each :

(1) In which year was the first psychology laboratory established?
(2) Who is considered as the 'Father of American Psychology'?
(3) What is meant by an experimenter?

Q.5. Define the following concepts :

(1) Replicability
(2) Correlation coefficient

Q.6. Write short notes on the following :

(1) Observation method
(2) Survey method
(3) Case study method
(4) Importance of rationality

Q.7. Answer the following questions in detail:

(1) Write detailed information of the experimental method in psychology.
(2) Explain some of the challenges in establishing psychology as a science.
(3) Explain some of the characteristics of a rational individual.
(4) Explain the types of correlation.
(5) Explain the key features of science.

Q.8. How Rational Am I ?

(1) Identify the strongest and the weakest characteristics in you from those explained by Dr. Albert Ellis.
(2) How will you work on your weakest characteristic? Write two strategies.